An Efficient Method for Comparison of Safety Data of Drugs in the Same Pharmacological Category

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The FDA is involved in monitoring safety profiles for drugs on a regular basis. A profile includes all adverse reactions due to the administration of a drug. A problem faced in the monitoring process was insuring that the safety profile of the monitored drug could be compared to similar items in its drug class. It was not obvious how to carry out the multiple comparisons needed automatically without a costly conversion to a relational data base system. However, using the advanced filter feature of EXCEL 5, we were able to formulate a query system to perform all the needed comparisons.

COSTART (Coding Symbols for Thesaurus of Adverse Reaction Terms) software can tabulate a report by body system and counts for a user-specified number of drugs. The source of the count data is the number of adverse reactions reported to the FDA. Frequency is calculated based on the number of prescriptions written. The approximate frequency of each adverse reaction is expressed in the package insert labeling in terms of rough estimates or orders of magnitude, which are classified as

1) the most frequent adverse reactions (MF)
2) less frequent adverse reactions (LF)
3) other adverse reactions which occur rarely (RO).

Examples of reported frequencies are: one-third of patients, less than one-tenth of patients, one in 100 patients, and one in 1,000 patients.

The affected body system introduces another level of complexity. However, for comparison between drugs of the same category the body system stays constant. For each case we wish to know how the different drugs compare with respect to all adverse measures.

The following are the procedural steps used:

1. Make a selection of drugs in the same pharmacological category and create a file for each drug selected using the COSTART Listing. Number of adverse reactions reported and coded under each term constitute the raw data of the file.
2. All individual files are combined into another EXCEL spreadsheet and assigned the following numerics: 1= true or indicated reactions, and 0 = false or no reactions shown. This is done with respect to MF, LF, and RO.
3. Set the criteria for the query and define the criteria.
4. Click on DATA on the EXCEL 5 menu and select "Filter," "Advanced filter" to apply the query.
5. After the query is done, save the result in a separate spreadsheet.

Without the filter feature, to compare Drug A with other drugs (i.e. Drug B, Drug C, Drug D, etc.) in the same category to see whether the same adverse reactions are listed in the labeling, an elaborate and time-consuming manual task was performed. First, a spreadsheet was set up for all the drugs. Then an attempt was made to match the adverse reactions either by moving the spreadsheet around or by modifying the listings to leave space for newly reported items. This often led to uncertainty as to the possibility of omissions or human error.

With the query system, we can set up a spreadsheet for the comparison drugs and code adverse reactions with either a "1" for an event that is true or has occurred or a "0" for an event that is false or has no reaction shown. This is done with respect to the body system of interest and for MF, LF, and RO. If we want to see which adverse reactions are common within the drugs, we can set up query criteria for the drugs of interest on any level (i.e., either MF, LF or RO) or combination of levels of interest. The "advanced filter" produces a subset of the spreadsheet which only includes items that meet the defined criteria. This method enables one to do complex comparisons with multiple drugs and obtains results within a reasonable time frame. Similarly, the query could be formulated by body systems, by level of severity or even by lack of occurrence. There is a straightforward relationship between a statement of the conditions to be met formulated in a conditional English sentence and the setup of the query criteria on the spreadsheet. Frequently used queries can be saved and reapplied to other classes of drugs.

This query system presented here is not limited to drug comparison but could be used for any complex data comparison.

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